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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,850	01/30/2004	Satoru Ozaki	1309.43448X00	4136
24956	7590	04/14/2006	EXAMINER	
MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C. 1800 DIAGONAL ROAD SUITE 370 ALEXANDRIA, VA 22314			FARROKH, HASHEM	
			ART UNIT	PAPER NUMBER
			2187	

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/766,850

Applicant(s)

OZAKI ET AL.

Examiner

Hashem Farrokh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 and 16 is/are allowed.
- 6) ☒ Claim(s) 2, 6, 12 and 15 is/are rejected.
- 7) ☒ Claim(s) 3-5, 7, 11, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/30/04, 3/31/05</u> | 6) <input type="checkbox"/> Other: _____ |

The instant application having application No. 11/766,850 has a total of 16 claims pending in the application; there are 4 independent claims and 12 dependent claims, all of which are ready for examination by the examiner.

INFORMATION CONCERNING CLAIMS:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2, 6, 12, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,282,610 B1 to Bergsten.

1. *In regard to claim 2 Bergsten teaches:*

“A storage system (e.g, see column 19, line 43; Fig. 1) capable of transmitting data stored in a first storage control device to a third storage control device via a second storage control device,” (e.g, see column 14, lines 41-43; Figs. 1-2 and 16). Bergsten discloses a storage system with multiple control devices. Each control device is capable of receiving and transmitting data to one or more remote control storage devices.

“wherein said second storage control device (e.g, see column 22, line 50) comprises:”

“a first virtual volume which is associated with a real volume (e.g, see column 6, lines 30-35) and forms a pair with a copy source volume of said first storage control device;”

(e.g, see column 22, lines 50-53). *For example the second storage controller receives data (e.g., copy source volume) from the first storage controller. The virtual addresses (e.g., virtual volume) are mapped to real addresses (e.g., real volume) in each storage system.*

“a second virtual volume which is associated with said real volume and forms a pair with a copy destination volume of said third storage control device;” **(e.g, see column 6, lines 30-35)** and forms a pair with a copy source volume of said first storage control device;” **(e.g, see column 22, lines 53-58).** *For example the second storage controller transmit data (e.g., copy destination volume) from the second storage controller to the third storage controller (e.g., pair with copy destination). The virtual addresses (e.g., virtual volume) are mapped to real addresses (e.g., real volume) in each storage system.*

“a first control unit for reflecting storage contents of said copy source volume in storage contents of said first virtual volume;” **(e.g., see column 22, lines 64-67).** *Bergsten teaches that virtual address space or range (e.g., volume) for data has corresponding physical addresses or volume in each storage device.*

“a second control unit for reflecting storage contents of said first virtual volume in storage contents of said second virtual volume;” **(e.g., see column 23, lines 1-4).**

“and a third control unit for reflecting storage contents of said second virtual volume in storage contents of said copy destination volume.” **(e.g., see column 23, lines 9-13).**

2. *In regard to claim 6 Bergsten teaches:*

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"A second storage control device capable of transmitting data stored in a first storage control device to a third storage control device (e.g., see column 23, lines 9-13), said second storage control device comprising:"

"a first virtual volume which is associated with a real volume (e.g., see column 6, lines 30-35) and forms a pair with a copy source volume of said first storage control device;" (e.g., see column 22, lines 50-53).

"a second virtual volume which is associated with said real volume and forms a pair with a copy destination volume of said third storage control device;" (e.g., see column 22, lines 53-58).

"a first control unit for reflecting the storage contents of said copy source volume in storage contents of said first virtual volume;" (e.g., see column 22, lines 64-67).

"a second control unit for reflecting storage contents of said first virtual volume in storage contents of said second virtual volume;" (e.g., see column 23, lines 1-4).

"and a third control unit for reflecting storage contents of said second virtual volume in storage contents of said copy destination volume." (e.g., see column 23, lines 9-13).

3. *In regard to claim 12 Bergsten teaches:*

"wherein said real volume is present outside said second storage control device." (e.g., see column 6, lines 30-33; Fig. 1). *For example physical addresses or real volumes located in MSDs which is outside of storage controllers.*

4. *In regard to claim 15 Bergsten teaches:*

"wherein said first control unit, said second control unit, and said third control unit are respectively mounted on channel adapters for controlling data communication with a host device." (e.g., see column 6, lines 64-67 to column 7, lines 1-11; Fig. 3).

ALLOWABLE SUBJECT MATTER

Claims 1 and 16 are allowed.

Claims 3-5, 7-11, and 13-14 are objected to as being dependent upon rejected based claims, but would be allowable if rewritten in correct and independent form including all of the limitations of the base claim and any intervening claims.

1. *The primary reason for allowance of claim 1 in instant application is the combination with the inclusion of the following limitations: **a third control program for causing said second virtual volume to operate as the primary volume of said copy destination volume, and wherein said real volume is mapped to said second virtual volume, and said second virtual volume is mapped to said first virtual volume.***

2. *The primary reason for allowance of claims 3 and 9 in instant application is the combination with the inclusion of the following limitations: **wherein said second control unit reflects storage contents of said first virtual volume in storage contents of said second virtual volume by copying data stored in said first virtual***

volume to said second virtual volume via a communication path connecting an initiator port and a target port located in the same housing.

3. *The primary reason for allowance of claims 4 and 10 in instant application is the combination with the inclusion of the following limitations: wherein said second control unit reflects storage contents of said first virtual volume in storage contents of said second virtual volume by copying the data stored in said first cache memory to said second cache memory.*

4. *The primary reason for allowance of claims 5 and 11 in instant application is the combination with the inclusion of the following limitations: wherein said second control unit reflects storage contents of said first virtual volume in storage contents of said second virtual volume by copying the data stored in said first cache memory to said second cache memory.*

5. *The primary reason for allowance of claim 7 in instant application is the combination with the inclusion of the following limitations: wherein said real volume is mapped to said second virtual volume, and said second virtual volume is mapped to said first virtual volume.*

6. *The primary reason for allowance of claim 8 in instant application is the combination with the inclusion of the following limitations: wherein said first virtual volume and said second virtual volume are independently associated with said real volume.*

7. The primary reason for allowance of claim 13 in instant application is the combination with the inclusion of the following limitations: wherein at least either said first virtual volume said second virtual volume is provided in a plurality.

8. The primary reason for allowance of claim 14 in instant application is the combination with the inclusion of the following limitations: comprising a plurality of said second virtual volumes, these second virtual volumes respectively forming a pair with different copy destination volumes.

9. The primary reason for allowance of claim 16 in instant application is the combination with the inclusion of the following limitations: forming a second pair from said second virtual volume and a copy destination volume of said third storage control device; and synchronizing storage contents of said second virtual volume and storage contents of said copy destination volume.

: IMPORTANT NOTE :

*If the applicant should choose to rewrite the independent claims to include the limitations recited in either one of the claims, the applicant is encouraged to **amend the title of the invention** such that it is descriptive of the invention as claimed as required by sec. 606.01 of the MPEP. Furthermore, the **summary of invention** and the **abstract** should be amended to bring them into harmony with the allowed claims as required by paragraph 2 of sec. 1302.01 of the MPEP.*

As allowable subject matter has been indicated, applicant's response must either comply with all formal requirements or specifically traverse each requirement not compiled with. See 37 C.F.R. § 1.111(b) and § 707.07(a) of the M.P.E.P.

Conclusion

The prior art made of record and not relied upon are as follows:

- 1. U. S. Patent No. 6,687,718 B2 to Gagne et al. describes Method and apparatus for cascading data through redundant data storage units.*
- 2. U. S. Patent No. 5,787,459 A to Stallmo et al. describes Distributed disk array architecture.*
- 3. U. S. Patent Publication No. 2003/0191917 A1 to McBrearty et al. describes Apparatus and method of maintaining reliable offline mirror copies in virtual volume groups.*

*Any inquiry concerning this communication should be directed to Hashem Farrokh whose telephone number is (571) 272-4193. The examiner can normally be reached Monday-Friday from **8:00 AM to 5:00 PM**.*

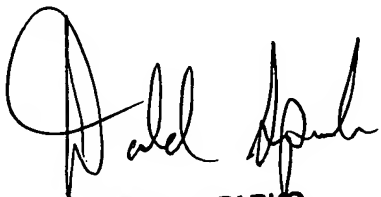
If attempt to reach the above noted Examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Donald A Sparks, can be reached on (571) 272-4201. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information

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about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBS) at 866-217-9197 (toll-free).

HF

2006-04-10



DONALD SPARKS
SUPERVISORY PATENT EXAMINER